Remarks

Applicant respectfully requests reconsideration of this application as amended. Claims 1, 18, 24, 45, 48, and 60-62 have been amended. Claims 58 and 61 have been cancelled. No claims have been added. Claims 2, 9, 13, 16-17, 19, 23, 26-29, 32, 35-36, 39, 42, 47, 50, 53-54, 57, and 59 were previously canceled. Therefore, claims 1, 3-8, 10-12, 14-15, 18, 20-22, 24-25, 30-31, 33-34, 37-38, 40-41, 43-46, 48-49, 51-52, 55-56, 60, and 62 are presented for examination.

35 U.S.C. §103(a) Rejection

Claims 1-6, 7-8, 10-12, 14-15, 18, 20-22, 24-25, 30-31, 33-34, 37-38, 40-41, 43-46, 48-49, 51-52, 55-56, 58, and 60-62 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Athitsos et al. "Distinguishing Photographs and Graphics on the World Wide Web," IEEE 1997, in view of Fukuda et al. (U.S. Patent No. 5,867,593). Applicant submits that the present claims are patentable over Athitsos in view of Fukuda.

Athitsos discloses an automated system that distinguishes photographs and graphics on the World Wide Web. Recognition tests are originated from statistical observations about the differences between computer-generated graphics and photographs that appear on the Web. Based on these observations, Athitsos creates image metrics, which are functions based on images. The image metrics are expressed in terms of real numbers, known as "metric scores". In order to achieve high recognition accuracy, Athitsos combines scores from several metrics. (Athitsos at pg. 10, Introduction.).

Fukuda discloses an image region dividing apparatus including a same-kind image region extraction unit for dividing a digital image into blocks by extracting boundaries, from the

background, of regions where same kinds of image are present, from the digital image. Also included are horizontal and vertical difference detectors for obtaining the difference values of the luminance levels of adjacent pixels in the horizontal and vertical directions from a discrimination target block. The apparatus further includes a feature pattern discrimination unit for performing recognition processing on the basis of a correlation between the shapes of a calculated correct luminance level histogram and a calculated gradient vector direction histogram. The apparatus also include an image kind determination unit for determining image kinds. (Fukuda at Abstract.)

Claim 1, as amended, recites:

A method to train image classification, comprising:
    measuring noise and edge sharpness in a first image;
    generating a feature vector from the first image by:
        generating a noise-reduced second image from the first image;
        calculating a difference between the first image and the second image;
        generating a noise pixel histogram of the difference to use as a noise feature vector;
        generating a blurred third image from the first image;
        calculating another difference between the first image and the third image;
        generating a sharpness pixel histogram of the another difference to use as a sharpness feature vector; and
            combining the noise feature vector and the sharpness feature vector as the feature vector; and
    training a classification model from the feature vector to classify a fourth image as a natural image versus an artificial image from the noise and the edge sharpness in the fourth image.

Applicant submits that Athitsos does not disclose or suggest generating a noise pixel histogram of a difference to use as a noise feature vector, generating a sharpness pixel histogram of another difference to use as a sharpness feature vector, and combining the noise feature vector and the sharpness feature vector as a feature vector used to train a classification model, as recited by claim 1. The Office Action acknowledges this when stating that Athitsos

"fails to disclose calculating a difference between the first and the second image to get a noise feature vector to use that for training the model." (Office Action mailed 3/16/06 at pg. 3, point 3.) However, the Office Action then states that "Fukuda teaches calculating a difference between the first and second image to get a noise feature vector to use that for training model." (Id.)

However, applicant further submits that Fukuda does not disclose or suggest <u>generating a noise pixel histogram of a difference to use as a noise feature vector, generating a sharpness pixel histogram of another difference to use as a sharpness feature vector, and combining the noise feature vector and the sharpness feature vector as a feature vector used to train a classification model</u>. The Office Action relies on the horizontal and vertical difference detectors of Fukuda as disclosing the calculating a difference between the first and second image to get a noise feature vector to use that for training model. (Id.) Yet, the horizontal and vertical difference detectors of Fukuda are described as "calculat[ing] a difference value between the luminance levels of an arbitrary pixel and a pixel adjacent thereto in the horizontal [or vertical] directions in image data output from the monochrome image converter." (Fukuda at col. 6, ll. 34-38.)

This is not the same as generating a noise pixel histogram of a difference to use as a noise feature vector, generating a sharpness pixel histogram of another difference to use as a sharpness feature vector, and combining the noise feature vector and the sharpness feature vector as a feature vector used to train a classification model. Fukuda compares "luminance levels" between adjacent pixels. There is no discussion in Fukuda of generating noise pixel histograms from the difference between images and also generating sharpness pixel histograms from another difference between images, and then combining these two histograms as a feature

vector. There is also no disclosure or suggestion in Fukuda of utilizing this feature vector to train a classification model.

As neither Athitsos nor Fukuda discloses <u>generating a noise pixel histogram of a difference to use as a noise feature vector, generating a sharpness pixel histogram of another difference to use as a sharpness feature vector, and combining the noise feature vector and the sharpness feature vector as a feature vector used to train a classification model</u>, any combination of Athitsos and Fukuda also does not disclose or suggest such a feature. As a result, claim 1 and its dependent claims are patentable over Athitsos in view of Fukuda.

Claims 7-8, 10-12, 14-15, 18, 20-22, 24-25, 30-31, 33-34, 37-38, 40-41, 43-46, 48-49, 51-52, 55-56, and 60-62 stand rejected for the same reasons set forth in the rejection of claims 1-6, because claims 7-8, 10-12, 14-15, 18, 20-22, 24-25, 30-31, 33-34, 37-38, 40-41, 43-46, 48-49, 51-52, 55-56, and 60-62 claim similar subject matter as claimed in claims 1-6.

Independent claims 14, 18, 21, 33, 43, 45, and 51 include similar features as claim 1. As a result, claims 14, 18, 21, 33, 43, 45, and 51, as well as their respective dependent claims are also patentable over Athitsos in view of Fukuda for the reasons discussed above.

Independent claim 7 recites training a classification model from a feature vector, the feature vector including at least one feature of an image selected from the group of at least one text block feature, at least one edge-location feature, and at least one aspect ratio of an image. Athitsos' method distinguishes photographs from graphics by using a number of metrics. Fukuda provides an image region dividing apparatus for dividing and classifying image regions of an input image. However, Athitsos and Fukuda, taken alone or in combination, do not disclose or suggest training a classification model from a feature vector, the feature vector including at least one feature of an image selected from the group of at least one text block

feature, at least one edge-location feature, and at least one aspect ratio of an image. Therefore, claim 7, as well as its dependent claims, is also patentable over Athitsos in view of Fukuda.

Independent claims 11, 24, 30, 37, 40, 48, and 55 include similar features as claim 7. Thus, for the reasons discussed above with respect to claim 7, applicant respectfully submits that claims 11, 24, 30, 37, 40, 48, and 55, as well as their respective dependent claims, are also patentable over Athitsos in view of Fukuda.

Applicant respectfully submits that the rejections have been overcome and that the claims are in condition for allowance. Accordingly, applicant respectfully requests the rejections be withdrawn and the claims be allowed.

The Examiner is requested to call the undersigned at (303) 740-1980 if there remains any issue with allowance of the case.

Applicant respectfully petitions for an extension of time to respond to the outstanding Office Action pursuant to 37 C.F.R. § 1.136(a) should one be necessary. Please charge our Deposit Account No. 02-2666 to cover the necessary fee under 37 C.F.R. § 1.17(a) for such an extension.

Please charge any shortage to our Deposit Account No. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

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